

India and Maastricht

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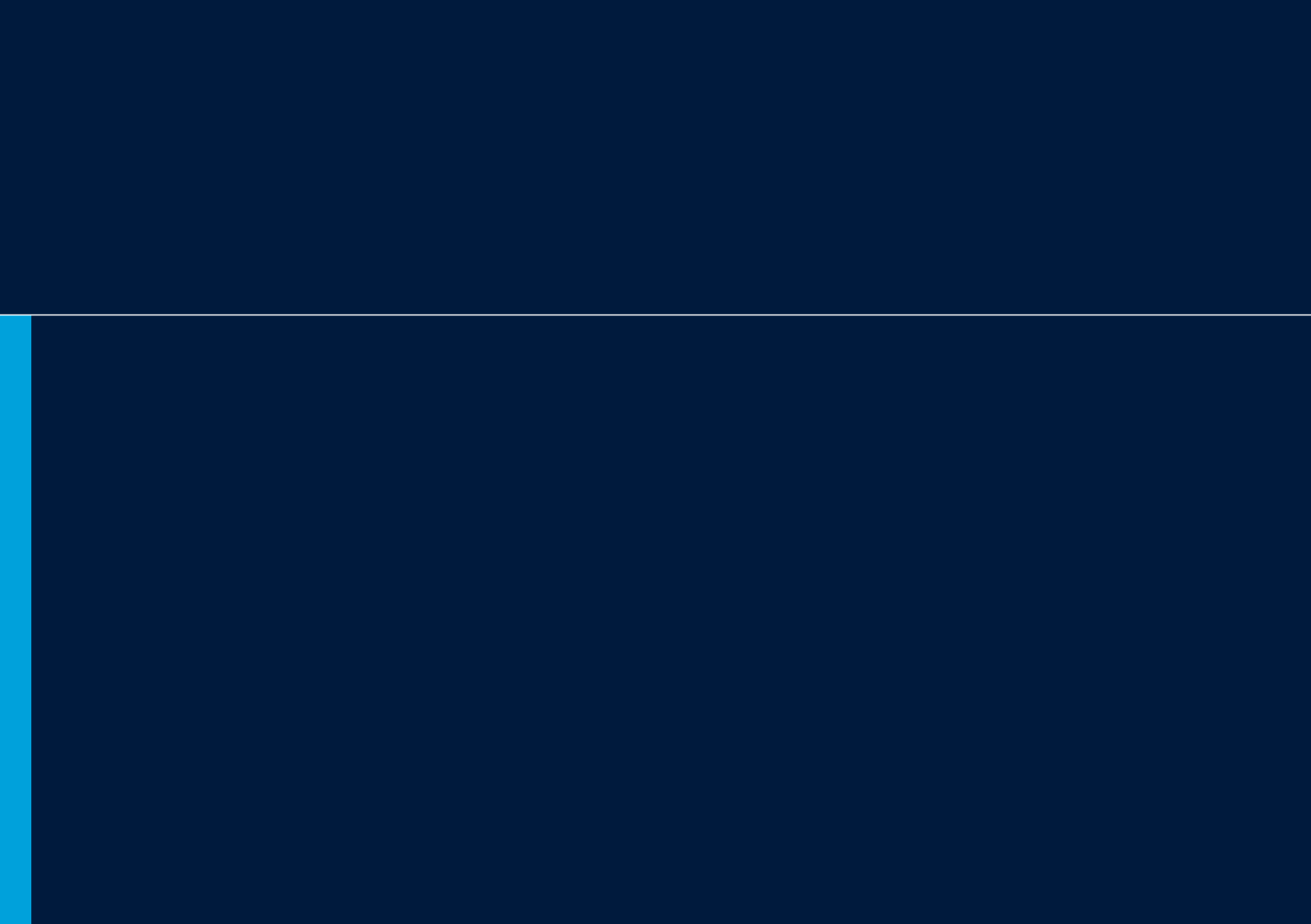
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Speeches

Dies Natalis Thursday 08.01.2009



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India and Maastricht

Dr. ir. J.M.M. Ritzen, President, Maastricht University

Ladies and gentlemen, honoured guests,

I welcome the representatives of our national government, the provincial government and the municipalities of Limburg. The name Maastricht University was adopted 12 years ago to reflect the Maastricht Treaty: a turnaround in the development of Europe as a major region in the world. At the same time, we remain committed to the whole Province of Limburg.

I welcome the representatives from foreign governments, in particular the Indian ambassador in the Netherlands, given the fact that this day very much focuses on India; representatives of the business community in Limburg, the Netherlands, Europe and worldwide; and representatives of the learning community in our area and beyond. A great welcome to our academic staff and their partners, as well as

our Board of Supervisors. And finally, a special welcome to our guest speaker, Mr Narayana Murthy. We feel privileged that you are here today to enlighten us on the topic of why Europe and India matter to each other in a globalised world.

Ladies and gentlemen,

We celebrate today the start of a new academic year.

A fresh group of eager young people has sought us – Maastricht University – out as the place to be to enjoy the thrills of learning: as an art in itself, and to develop their talents to be even more effective in the future.

We welcome you, new students and those who continue their studies with us. You are our main purpose. Our reason for existence is to serve you as best as we can. We make it a point to be a research university which wants to be the best

possible place for learning: 'leading in learning' is our motto. Our university adopted Problem-Based Learning – PBL – throughout all our degree courses as a means to promote student learning when the advantages of this method over traditional lecture-hall teaching were demonstrated in the 1960s and 70s. We know of no other university which has adopted Problem-Based Learning throughout all disciplines and departments, with its inherent feature of student-centered learning in small groups with devoted tutors.

It is this attention to learning by Maastricht University since its inception which has brought us the highest levels of appreciation for our teaching and education achievements. All our degree programmes are already ranked among the very best in the Netherlands.

Last year, four of these programmes also participated in the German quality comparisons: Psychology, International Business, European Studies and Economics. It is with great pride and delight that we came out on top of the German university ranking – the *Spitzengruppe* – for each of these programmes.

Increasingly, our reputation is attracting students from outside the Netherlands. Around 40% of our new enrolments for this academic year come from abroad. And for

the master's phase, the majority of them are foreign: about 64% come from abroad, and of this 64% about one third is from outside the European Economic Area.

Globalisation has taken society by surprise: as a thief in the night, in utmost stealth, it stole the national and regional boundaries of our knowledge, of our production, of our social cohesion, of our institutions. Or so it seems to many of our citizens. Some were awake and might have observed what happened, if only they had been aware of it. In any case: we now find ourselves in a state in which most of our institutions have been overtaken by globalisation.

Universities are a prime example: most of them have been unable to adapt to these new developments and are thus insufficiently serving society with the globalised leadership it needs.

Globalised leadership is the ability to function effectively on the international labour market in senior positions: where strategic decisions are taken in both the private and the public sector. These are the positions for which universities should develop the 'neuro-software' for their students, which both reflects past experiences in the selected fields of study and encompasses the potential for new and continuing insight.

Here the link with India and our other target countries beco-

mes evident. At last year's opening of the academic year, I presented Maastricht University's strategy as focusing on four regions outside Europe to attract in the long run some 800 master's and PhD students annually.¹ These countries are India, China, Turkey, the Gulf states and Saudi Arabia. This strategy represents a 'no-regret' approach leading in to the next 10 to 20 years, when we will see a demographically induced and significant decrease in the number of students in Europe, while at the same time the demand for university graduates on the European labour market is expected to increase. The combination of this decrease in the supply of and increase in the demand for university graduates could well be viewed as a 'perfect storm'.²

This insight has prompted Maastricht University to adopt a model of 'brain circulation' rather than 'brain drain' to bring students from outside Europe to Maastricht for master's and PhD programmes. In this approach we are cooperating closely with Dutch companies abroad and foreign companies from the target countries in the Netherlands. In addition, we are seeking associations with universities in those countries. And lastly, we want to establish a Knowledge Resource Centre in Maastricht to focus areas of cooperation with these target countries. Against this backdrop we are very fortunate to have with us

today our speaker, Mr Narayana Murthy, from whose experiences we as a university can learn a great deal. First of all, because India as a country has been very successful in converting brain drain into brain circulation. But also because the company Infosys – of which he was both a founder and the long-time CEO – has been a model company due to its innovative approaches, and has signalled India's change towards more service-oriented industry. So we are very happy you could be here with us today.

For the target countries, this brain circulation model indicates the contribution that degree programmes in Maastricht can make towards the employability of their graduates. It also involves a potential brain gain for the Dutch economy as well for the emerging economies. It includes intellectual capacity creation in the associated universities in the target countries by setting up joint research and education programmes, which helps in the worldwide dissemination of knowledge.

In the UK, foreign students – who pay the full tuition fee – contribute substantially to the economy (this is known as 'export' as it involves the transfer of money from outside the UK into the UK). The British Council recently concluded

¹ 'Inspired by Talent', Maastricht University Strategic Programme 2007–2010, 2007

² J. Ritzen, 'Higher Education's Perfect Storm', presentation at the UNU/UNESCO Conference in Tokyo, 2007: www.unimaas.nl/bestand.asp?id=8792

that the education sector in the academic year 2003–2004 almost generated £28 billion of export earnings for the UK, mostly derived from the enrolment of non-EEA (European Economic Area) students in UK universities.³ And this does not even include the indirect effects on trade. From casual observation, we have to assume that trade relations with foreign countries outside Europe are improved by the presence of graduates of European universities in those countries.

All explorations lead to the conclusion that well-focused initiatives by European universities to attract students from outside Europe are a win for the student in question, for the country of origin, for the country of study as well as for the university from which the student graduates. Then why have so many of these initiatives taken in the past on the European continent failed?

I now give three reasons for this underperformance in the past, and comment on how they are taken into account at our university.

The first is that past initiatives did not adequately consider the nature of the demand for studies abroad. According to

market research by the Academic Cooperation Association (ACA), students in Asia are overwhelmingly interested in studying in English-speaking countries, because they see the acquisition of any language other than English as a unnecessary burden.⁴ Maastricht University deals with this not only by providing its degree programmes in English, but by translating the whole university environment into English, including faculty and university policy documents but also the service delivery to our students and staff.

A second reason is that non-EEA students choose in favour of a certain university on the basis of the perceived reputation of that university.⁵ Until recently these perceptions could not be verified reliably through published rankings. With the so-called 'Shanghai ranking'⁶ and that of the Times Higher Education Supplement, however, published information (albeit also quite arbitrary) is now available. Maastricht University is quite high up in the 2007 World University Rankings from the Times Higher Education Supplement; namely, number 111 out of the 40,000 universities which were considered worldwide. Given the importance that students attach to this ranking, we are proud to be so high on the list.

³ British Council, Global value. The value of UK education and training exports: An update, September 2007

⁴ Academic Cooperation Association (ACA), Perceptions of European Higher Education in third countries, Brussels: 2006: www.aca-secretariat.be/02projects/completed_projects.htm

⁵ Ibid

⁶ Shanghai Jiao Tong University, Academic Ranking of World Universities (Shanghai Jiao Tong ranking)

A third reason is the focus and structure of the initiatives. Some initiatives were launched top down, without sufficient commitment from senior faculty staff. Some were the result of the efforts of senior faculty staff without the proper financial and structural backing from senior management. In any event, they seldom had a serious 'business model' with the financial means for adequate investment. But we have learned from these mishaps with a strong business model which allows, for example, for the set-up of an office in Bangalore, an India Institute in Maastricht, as well as our initiatives in Saudi Arabia.

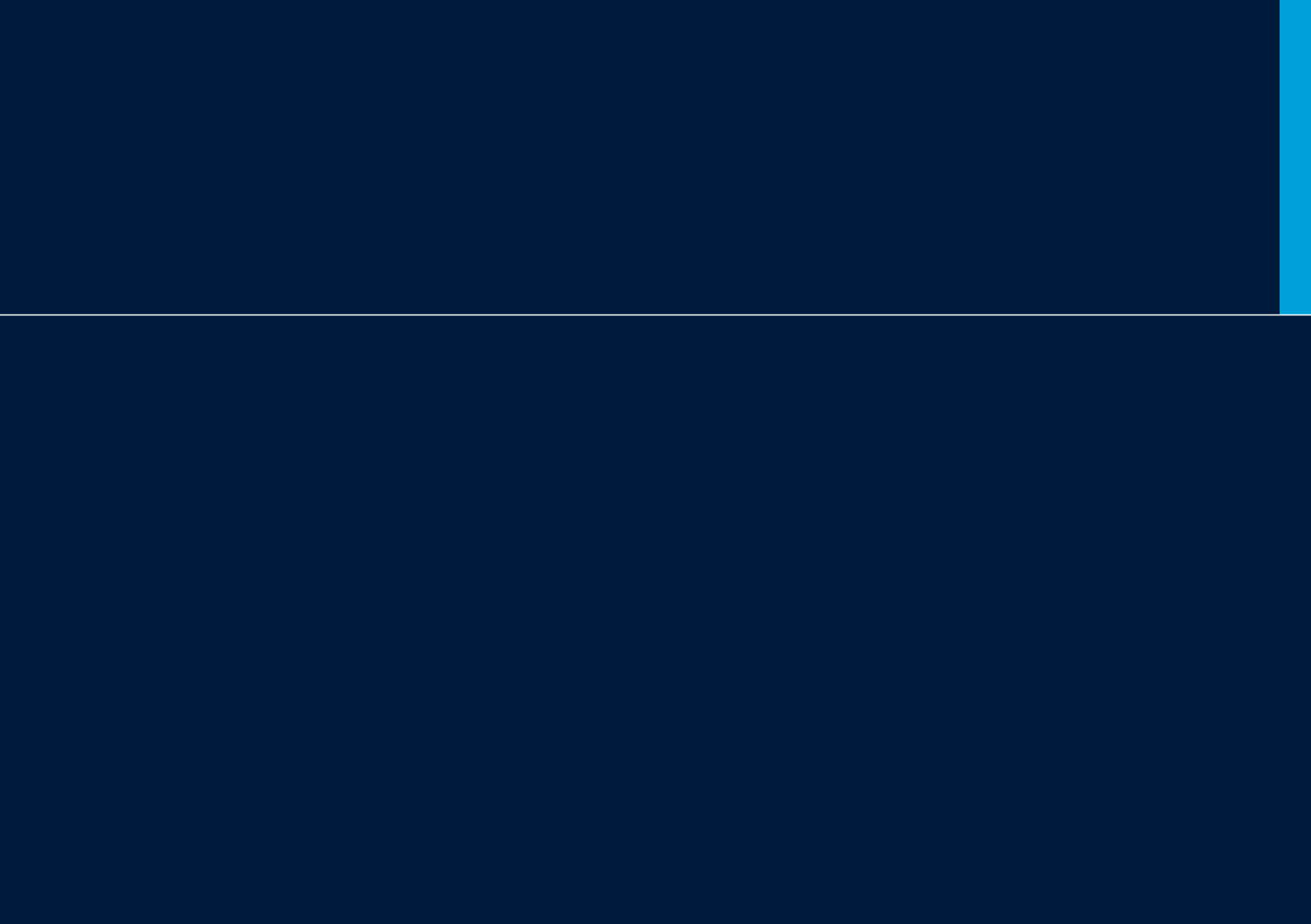
We should dwell on the significance of the increase of foreign students on the learning climate that Maastricht University offers its Dutch and foreign students alike, and

how it affects their position in the labour market. We then realise that 80% of the European graduates indicate that they work in an international labour market.⁷ How could they be better prepared for that labour market than through studying in an international environment, with fellow students from all over the world?

At the same time, we realise that we have not yet fully exploited in our approach to education the benefits of cross-cultural learning. This is another new challenge, which fits well with our motto 'leading in learning'. That motto is also about learning what a university ought to be. Noblesse oblige.

Thank you for your attention.

⁷ L. Borghans & J. Ritzen, 'The international dimension of higher education and the work of graduates in Europe', paper presented at the European Labour Market for Graduates conference, Maastricht 2006: www.unimaas.nl/elm/



Why Europe matters to the emerging countries and emerging countries matter to Europe

Narayana Murthy, Chairman and Chief Mentor of Infosys Technologies Limited India

I am honoured by the invitation to speak at the opening of the academic year of this famous university. There are two reasons why I feel privileged to be here in this great city. First, an agreement to create a very successful economic integration initiative leading to the formation of European Union was signed here in 1993. Today, the European Union is a strong and vibrant player in the global market with a combined GDP of over US\$18 trillion, contributing close to 30% of the world's GDP. Second, this is the hometown of my favourite conductor – André Rieu.

As I stand here, I see lots of young, confident, happy and enthusiastic faces ready to take on huge challenges.

I am glad it is so since the world you have inherited is so different from the one that I opened my eyes to, thanks to a phenomenon called globalisation that has brought nations

together, that has made this world an integrated village, and that has created huge opportunities for corporations worldwide to explore new opportunities. Therefore, I will speak about how globalisation has benefited the world, how you – the young Europeans pursuing your education at this great university – will have to embrace a new world, a new mindset, a new paradigm and a new set of opportunities and challenges, and how this new world would create an opportunity for developing countries like India and for developed countries in Europe to leverage each other's strengths.

What is globalisation? I will define it at two levels. At the macro level, it is about frictionless flow of capital, services, goods and labour across the globe. It is also about global

sharing of ideas, knowledge, and culture. It is about creating a shared concern and plan to fight global issues like poverty, AIDS, terrorism and global warming. At the microeconomic or firm level, it is about sourcing capital from where it is cheapest, sourcing talent from where it is best available, producing where it is most efficient and selling where the markets are, without being constrained by national boundaries. Infosys, IBM and Adidas are all good examples of globalisation at the firm level.

Thanks to globalisation, today, we live in a world where every nation that has something to contribute to the global bazaar can improve the lives of not just her people but people throughout the globe – the rich and the poor, the powerful and the weak, the educated and the not-so-educated. Globalisation has given an opportunity for developing countries to take their share of limelight in the global bazaar both as producers and consumers. In fact, currently, more than half of world's GDP, measured in purchasing power parity, is generated by developing countries. The air travellers in the US going from La Guardia airport to Ithaca flying Embraer aircraft from Brazil; well-known European companies running heart-beat systems designed by Indian software engineers; the Indian companies and the Indian operations of companies like Intel, GE, CISCO and Texas

Instruments filing over a thousand patent applications with the US patent office in the year 2004 alone; and sophisticated electronic gadgets like iPods, manufactured in China and filling the shelves of supermarkets in the US and in Europe, are all good examples of the global integration and the contribution of the developing world to the global economy.

What are the implications of globalisation?

- First, corporations worldwide will face extreme competition as innovation could come from anywhere in the world – both developed and developing nations.
- Second, lifestyles of people across nations, developed as well as developing, will undergo transformation. In the case of developed nations, consumers will find the imported products cheaper and better. In the developing nations, millions will be pulled out of poverty as the disposable incomes will increase on account of improved employability and enhanced per-capita incomes.

- Third, the consumer base will shift to developing economies, thanks to their fast-growing economies, higher disposable incomes and demographic differences, with countries like China and India having a large number of consumers in the under-30 age category. Thus, you have to stop thinking of just the 'rich' customers of developed economies.
- Fourth, innovation will become the key to success. Because there are so many competitors who will commoditise your innovation quickly, you will have to learn to innovate faster than your competitors. The flat world or the globalised world is essentially about how fast you can develop new ideas, implement them, and gain competitive advantage in the marketplace so that you can create a better company, society, country and world.

There are many reasons why globalisation and emerging economies (EEs) should be on the top of your agenda. First, thanks to globalisation, EEs have been growing fast. Several indicators show that the emerging economies are gaining dominance in the world economy. According to *the Economist*, their share of world exports has jumped to 43% in

2006, from 20% in 1970. EEs consume over half of the world's energy and they have accounted for four fifths of the growth in oil demand in the past five years. They also hold almost three quarters of the world's foreign-exchange reserves. China, with an average annual growth rate of over 10% in the last 15 years, and India, with over 7% average annual growth rate during the last 10 years, are just two examples.

Domestic markets in the EEs are growing faster than ever. For example, the retail sector in China has been growing at 15% for the last 20 years. China is already the largest mobile telephone market with over 400 million subscribers. The mobile telephone market in India is growing at 9 million new subscribers each month. The fast-moving consumer goods (FMCG) market in India is around US\$10 billion and is growing around 7%. China adds 33 million PCs a year while India adds 8.5 million PCs a year. I can go on and on with such data. The message is clear – there is fortune to be made in these markets, in general, and from the poorest segment of these societies, called the bottom of the pyramid (BOP), in particular.

Second, the world has moved from viewing emerging economies as perennial recipients of aid from the rich

countries to viewing them as sourcing zones, manufacturing hubs and markets. The flat world phenomenon has created a large number of jobs and has started the eradication of poverty in EEs. In other words, there is a consensus that creating a level playing environment leads to sustainable economic prosperity as against providing economic aid to the EEs. China's success as the factory of the world and India's emergence as the software development centre of the world are good examples of this paradigm. Third, a significant percentage (as much as 65% to 70%) of the population of these EEs lives with an income of just about US\$2 a day. What is interesting is that these poor people are value-conscious consumers who will buy products and services as long as they get value for money. While per-consumer revenue and profits may be low, their large volumes will, indeed, add up to a tidy sum of profit. Performance of European corporations like Philips, Nokia and Unilever has proved that there is money to be made at the bottom of the pyramid. So far, the EEs have mostly been off the radar screen of MNCs who were used to western business models. The challenge is to lure the bottom-of-the-pyramid consumers by enabling dignity and choice through markets, as Professor Prahalad says. This bottom-of-the-pyramid market is close to 120 million households in

just India alone. What is needed is to look at the poor as profitable consumers and provide affordable solutions through innovation. Let me give you just two examples to illustrate my point.

Philips, a firm with over 20,000 inventions to its credit, is targeting the bottom-of-the-pyramid households very seriously. Philips has come up with several products and initiatives to improve the lives of the masses. Let me give you two examples. In the villages of India, women are forced to cook on indoor wood-burning stoves. This means blackened ceilings and walls, and a long wait. Philips has piloted a woodstove that reduces pollution due to smoke by 90%. Philips is also piloting an initiative called SMILE (Sustainable Model in Lighting Everywhere). This initiative is aimed at providing affordable, high-quality energy-efficient, clean lighting solutions to rural India, which is home to over 650 million people. Philips has also created two bottom-of-the-pyramid products – a rechargeable lantern and a hand-cranked LED flashlight – in the lighting category.

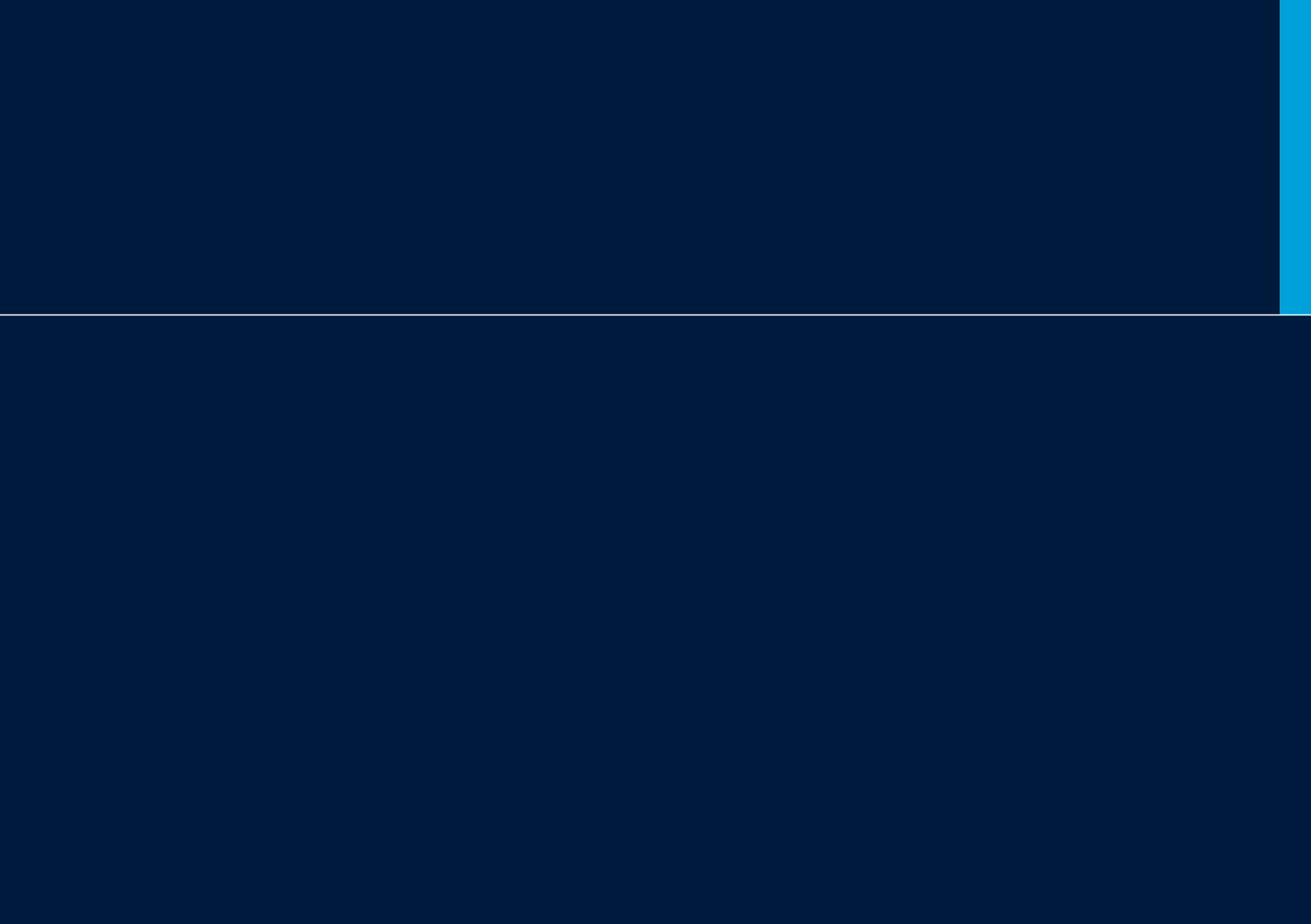
Another European firm, Nokia, has created a mobile phone for less than US\$50 for the Indian markets. This has become a runaway hit and Nokia has introduced this model in other developing economies, making the model the best-selling mobile handset model ever with 200 million pieces sold worldwide.

Fourth, the growth rates of companies in several sectors like food, personal care, automobiles, banking and retail in the developed world are flattening. These companies are looking at the emerging markets in Asia and Latin America for maintaining their growth rates, and margins. Open any magazine and you will see that the contribution of Asia is increasing steadily in the revenue and profit profile of several well-known corporations. For example, India and China are some of the fastest growing markets for auto and airline industries. A recent report by PricewaterhouseCoopers notes that the BRIC countries – India, Brazil, Russia and China – will account for more than 40% of the forecast for global light vehicle assembly increases, and represent 52% of the industry's forecast for global capacity expansion during 2005–2010.

Fifth, most of the anger, violence and terrorism that we see today is due to the huge economic divide that exists between the haves and the have-nots. A sure way to reduce this divide is to focus on bringing the poorer world into the mainstream by making them trade partners so that it is a win-win proposition. A world concentrating on improving the quality of life through international trade is likely to be a peaceful world. In doing this, you, as the future leaders, have an important role.

Folks, I have no doubt at all that you, the future leaders of this nation, this continent and this world will adapt to this new world, face the challenges, seize the opportunities, exceed our expectations and leave a planet richer, happier, greener and safer than the one you have inherited.

Best wishes for a great future at this university.
Thank you.



Speech on the occasion of the 33rd Dies Natalis
8 January 2009

Based in Europe, focused on the world

Prof.dr. G.P.M.F. Mols, Rector Magnificus

Ladies and gentlemen,

We live in an era of one-liners and slogans. The most important to date may be that used by the president elect of the United States: "Yes we can". With this he suggests that the virtually impossible can become possible simply by saying it and believing we can do it. It's about the power of the word, which can be very inspiring.¹

Our university, too, which celebrates its anniversary today, has not been able to go without this trend of one-liners and slogans. We are based in Europe, focused on the world, and what's more: leading in learning. These are concepts to be

proud of and which have a large impact, especially abroad. On a festive day like this, our university, our academic community, deserves to briefly consider the things that bind us.

We are a research university where excellent research is interwoven with attractive and high-quality education. Noblesse oblige. And this year we will enhance this interweaving by introducing a university-wide research-based project for excellent bachelor's students, who will address research issues together with and supervised by inspiring

¹ Incidentally, the expression is not as new as some might think. In Africa, the expression *Sinakho* essentially means "We can do it". It is also the title of a 1992 report evaluating the role of nongovernmental organisations in building a just and democratic South Africa. The report mentions that *Sinakho* is an enjoining Xhosa concept with a communal component. In its simplest form it means: We can! Its value is that it implies awareness of hitherto locked and almost unknown potential. In this way it is an internal source of motivation and a challenge to those who make the statement. When extended it takes into account the environment and almost becomes like *Deo Volente! Sinakho akaba nje*: We can do it if only this, that or the other were to happen. Evaluation by C. Flinterman, M. Msoki, T.C. van Banning, J van Soest, The Hague, October 1992.

principal investigators. The programme will bring together students and researchers from different disciplines to address multifaceted and complex problems from various angles in an interdisciplinary and transfaculty setup. The research issues may stem directly from issues that the different research teams are dealing with, but they may also be requested by local governments or the regional business community. The research-based bachelor's project therefore brings our top students into contact with the fascination for research and teaches them the methods and techniques needed to become a good researcher. With its research-based undergraduate education, the university can contribute more to the societal role that is expected of it, that is to say training and delivering excellent researchers, and helping solve societal problems that require urgent answers. Likewise, the university's learning and working project, too, is aimed at bringing society closer to academia.

As a research university we can look back on a year in which we were once again ranked highly. This is reflected, among other things, in our education and research review evaluations, but also in the increase in funding from contract research. In terms of indirect government funding – the grants from the Netherlands Organisation for Scientific Research and European grants – we face a serious challenge. Still, I am convinced that the quality, commitment and passion of our researchers and their

staff, which have led to many publications in prestigious journals including *Science* and *Nature*, and to a great many splendid books made in Maastricht, will also lead to successes in indirect government funding.

Ladies and gentlemen,

Based in Europe, focused on the world. This is where two interesting characteristics come together.

As a university established in Europe, we implicitly indicate that we endorse European values. But the question is whether there are any recognisable European values. Europe seems to be a unity of diversity. The many differences between its societies reflect our different levels of economic development and different cultural heritages, languages, religious and ideological traditions, and political and educational systems. So one might contend that there is no such thing as European values.²

But this is not to say that 'based in Europe' is without import, because values that have significance definitely exist. After all, the European Union is based on fundamental values described in its Charter of Fundamental Rights. And the charter's preamble might well indicate the direction for the university: "Conscious of its spiritual and moral heritage, the Union is

² Fred van Raaij: Outlook, in: Atlas of European Values, page 125.

founded on the indivisible, universal values of human dignity, freedom, equality and solidarity.” These are the values we identify with as a European university, both externally and internally. Our university is also a reflection of Europe, with its emphasis on fundamental values that do justice to this very diversity. We have not only developed programmes with a strong focus on Europe which build further on the values I just referred to; rather, we also strive for a position as a genuinely international university with a large degree of diversity. This calls for an academic community of international staff and students. Indeed, an international student population is the proof of our belief in world citizenship, whereby making the university a meeting place for diverse peoples is an important instrument that contributes to the world’s becoming a better place. Thus, we are required to ‘go international’ not only by demographic developments, but also because of the conviction that academia is the place where diverse people – future leaders – come together in unity.

Ladies and gentlemen,

While diversity is a great good, it can also constitute a serious problem if insufficient time and attention is spent on social inclusion, or offering a safe environment in which differences are valued.³

This is where a new, special characteristic of Problem-Based Learning manifests itself. This educational methodology values and respects differences, because it is these which make the difference in this type of education and learning process. They genuinely matter when it comes to the exchange of knowledge and experiences; provided it is applied correctly, Problem-Based Learning is a powerful instrument in the policy of diversity and inclusion. Because it is about continually innovating and improving education, both in terms of form and content, our university can use this methodology to distinguish itself once again and prove its worth as a university that is leading in learning.

Portfolio management education is another quality that enables us to constantly develop an attractive offer of degree programmes. Many new programmes have been devised, and we have increasingly been able to make the introduction of the bachelor–master system into more than a cosmetic operation. It’s about content, meeting the demand for excellent education programmes, and responding to market needs. But it’s also about form, about further developing Problem-Based Learning, for example along the lines of two key areas: the research-based bachelor’s and the working and learning project.

³ See Joke Mat: Diversiteit, in: NRC Focus, 4, 2008, page 95.

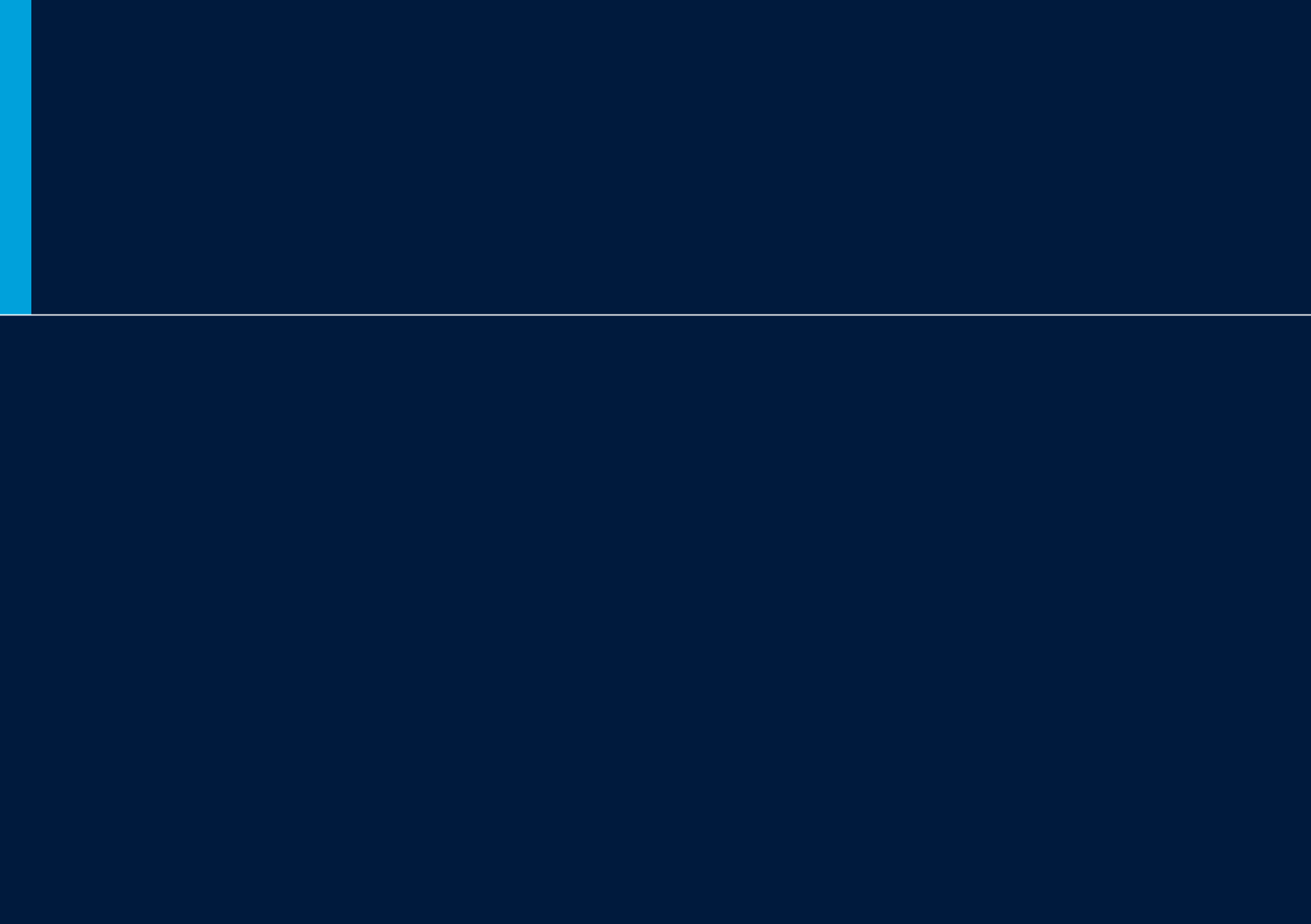
It goes without saying that new forms of blended learning play a prominent role here. We see that all sorts of partnerships between universities are coming about in Europe. The very theme of leading in learning could be the link for a consortium in which the strength of educational development is centre stage. Clustering this knowledge may be an important incentive to flesh out leading in learning, along with extending and concentrating the capacity currently available at our university. This will at the same time lend more strength to our focus on the world. As a university we have a good reputation when it comes to exporting our education. Coupled to the strengthening of potential in the field of development studies, from this position the university can maintain its lead in capacity development in countries where the quality of education is in urgent need of new stimuli.

Ladies and gentlemen,

Let us celebrate our university's birthday with confidence. Founded as a special knowledge institute distinguished from the rest, Maastricht University in the past year has once more been able to stand out repeatedly. Thanks to the commitment and keen dedication of all our employees, academic and support staff alike, as well as our students, our university is doing well. It is a community where creativity, originality, commitment, solidarity and respect for everyone's contribution constitute its mainstay. Many thanks for this.

I began with one-liners and slogans. Based in Europe, focused on the world, leading in learning. And now I add: Maastricht University, made for people, made by people.

Thank you for your kind attention.



Speech on the occasion of the 33rd Dies Natalis
8 January 2009

Vulnerability in technological cultures

Prof. dr. ir. W.E. Bijker

We live in vulnerable worlds.* As individuals we run the risk of being mugged in the dark alleys of Maastricht. Our material world may be threatened by floods, earthquakes, or aeroplane crashes – depending on where we are. Our social institutions such as family or church may be eroded by individualisation. And our culture, some argue, is being attacked by McDonald's and other immigrants.

These examples show that vulnerability is not exclusively associated with physical violence, nor only caused by natural disasters. If you still have some money in the bank after the financial crisis, this may suddenly be spent by someone who stole your credit card details from the Internet. And if you visit the hospital with a mere broken leg, you may return home with a multi-resistant bacteria infection. The Indian village of Sircilla recently became vulnerable due to

changing textile markets, resulting in many suicides of weavers who were overwhelmed by financial debts.' When I use the term 'vulnerability', this refers to all sorts of death, destruction and disintegration of humans, technical systems and social networks.

How to understand these vulnerabilities? What use could it be to lump these very different forms of vulnerability together and study them within one framework? Why study them at all?

I will argue today that studying vulnerability is fruitful for both scientific and social purposes. It yields an important broadening of the research agenda as compared to a mere focus on risks. And a focus on vulnerability allows for new approaches to social problems and thus will have effects on the political agenda too.

When we say that a system is vulnerable, we typically want to say that it is susceptible to harm. Vulnerability thus is a property or characteristic of systems – be they technological, ecological or social. Mostly, vulnerability is used as a specific rather than a generic characteristic: a city may be vulnerable to damage by specific disturbances, such as floods, and not to damage by other disturbances. A city like Washington is vulnerable to terrorist threats in the form of a letter with some white powder; such a letter would most probably have no effect on an Indian village. The Indian village may be vulnerable to the effects of globalisation of the cotton trade, while an American city may thrive on that same aspect of globalisation.²

Three points I want to make about the concept of vulnerability. The first is that vulnerability can best be studied as vulnerability in a technological culture. My second point is that vulnerability is not simply and exclusively negative: new opportunities emerge from recognising vulnerability. The third and final point is that issues of vulnerable technical systems are too important to be left to engineers; issues of vulnerable social networks are too important to be left to social scientists; so: questions of vulnerability typically require the kind of interdisciplinary research that Maastricht University is known to deliver.

Vulnerability and technological cultures

We live in technological cultures.³ Today's societies are

thoroughly technological, and all technologies are pervasively cultural. Technologies do not merely assist us in our everyday lives; they are also powerful forces acting to reshape human activities and their meanings. When a sophisticated new technique or instrument is adopted in medical practice, it transforms not only what doctors do, but also the way patients, nurses, doctors think about health, illness and medical care. Coastal defense (I mean: dikes and levees) in the Netherlands and the United States mirror the differences in risk culture in both countries and different ways of being vulnerable.⁴ Indeed, one way to summarise two decades of research in the field of science, technology & society studies (STS) is the statement: we live in a technological culture.⁵ All technologies are culturally shaped and all cultures are technologically constituted.⁶

So, cultures are technological cultures because technology plays a crucial role in constituting them. However, technological development does not only support and strengthen the structures of societies. The high-tech character of modern societies makes these structures vulnerable at the same time. Such vulnerability is an inherent characteristic of today's technological cultures. If you are not part of the globalised financial system, you do not suffer when the mortgage market at the other side of the world drops into crisis. If there are no aeroplanes, terrorists cannot steer them into high-rise

buildings. If you do not have dikes, they cannot break. And even worse: technologies not only make accidents possible – they ask for it. Once you have such large technological systems, accidents are inevitable. Accidents, Charles Perrow argued, are ‘normal’ in complex and tightly knit technological systems.⁷ To sum up this step in the argument: most cultures are technological cultures; and technological cultures are inevitably vulnerable.

Let us now again focus on the concept of vulnerability. The origin of vulnerabilities is best studied in its relation to technologies: it can be a lack of technologies (like when the lack of simple water purification technologies causes a high mortality by cholera) or the unintended effect of the use of technologies (like the increased financial debts of Indian farmers because of their need to buy chemical pesticides). Almost all instances of vulnerability are thus shaped by technologies. At the same time our default defense mechanism against vulnerability is to call upon technology. To improve patient safety in a high-risk and technology-intensive environment such as an intensive care unit, we typically invest in more technologies: electronic technologies for monitoring, and social technologies of protocol to discipline the doctors and nurses. When the livelihoods of handloom weaving communities in India are threatened by globalising markets because their customers start buying mass-produced synthetic and

brightly printed fabrics, one reaction is to invest in the technology of the powerloom, and to embrace the administrative technologies of centralised marketing and mass culture. When the Netherlands are threatened by sea level rise due to climate change, we invest in higher dikes. I can now make my first conceptual point about vulnerability: vulnerability is best to be studied as a characteristic of technological culture. This will help to bring out the interactions between the various dimensions of vulnerability: technological, scientific, social, economic, political, ethical and cultural.

But what does this buy us? Is it more than an invitation to look past the end of your nose? Or does it also change what you see there, and how to react to it? I do think so. Let me illustrate this with an analysis of the different forms of vulnerability to flooding in the US, and specifically New Orleans, and in the Netherlands. How is it possible that the US failed to keep its feet dry in New Orleans, when large parts of the Netherlands can exist below sea level? Does this suggest that the US Corps of Engineers is less capable than the Rijkswaterstaat engineers in the Netherlands? I will argue that something else is going on: the difference is not one of expertise, competence or technical quality, but one of coping differently with vulnerability in different technological cultures.

Histories of the Dutch and American coastal engineering

professions show that both studied the vulnerability to flooding and consciously learned from natural disasters. Yet, they did so in strikingly different ways.⁸ The American practice focuses on predicting disasters and mediating the effects once they have happened; in brief: the focus is on 'flood hazard mitigation'.⁹ Dutch practice, in contrast, is to keep the water out.

A long string of hurricanes in the 1950s in the US gave rise to a major effort by both the US Army Corps of Engineers (USACE) and the US Weather Bureau to develop warning systems and protective measures. Several surge prediction models were developed, with differences resulting partly from the different needs of the modellers: *protection* for USACE, *warning* for Weather Service, *insurance* for the Federal Emergency Management Agency (FEMA). The key phrase in the U.S. is 'flood hazard mitigation', and the key ideas are 'prediction' and 'insurance', which suggest that the very fact of flooding is accepted. The risk criterion that is used in designing levees and other coastal defense structures in the US is a 1:100 chance, or a 'hundred year flood'.¹⁰ This criterion is a technical norm, carrying important professional weight among coastal engineers, but it does not carry any legal authority.

How different is the practice in the Netherlands. I can still remember my father pleading, when looking back to *De Ramp*:

'whatever – that never again!' Those words by the first professor of coastal engineering in the Netherlands effectively and emotionally capture the *credo* of Dutch engineers since the 1950s. The water should be kept out, at all costs. In the Delta plan law, the criterion of 1:10,000 was specified: not merely as a technical norm, but as a legal obligation embedded in the 'Delta Law', unanimously approved by parliament.

The intriguing question is how to explain this difference between two technically advanced Western countries. And, even when we could trace some of the historical roots of these differences, why have the practices of coastal engineering not converged more – is this not just a matter of choosing the best science and technology, and aren't science and technology not universally valid, everywhere in the world? What is best for the Netherlands should be best for the US, or should it not...?

My suggestion is that the differences between American and Dutch coastal engineering styles are related to the differences between American and Dutch technological cultures. It is a standard STS point to stress that there is *not* something like a universal science and technology, independent of time, culture and context. There are national styles of coastal engineering, related to the technological cultures in which they are embedded.¹¹ What then are relevant characteristics of American and Dutch technological cultures? Granted: a few

differences pertain more to geographical circumstances than to the cultures themselves – the Netherlands just is a more watery country than the United States of America, with more sea coast and more river borders per square mile, and the Netherlands just does not have hurricanes. But there are striking differences in political culture and the role of the state too. American political culture can be characterised as neo-liberal, without belief in the common good as something that the government should define and protect; there is an inclination to privatise and individualise public functions, rather than calling upon the state to defend their value.¹² Although recently such neo-liberal tendencies have been emerging in the Netherlands too, Dutch political culture is quite different, with a much more accepted central role for the national state in all sectors of society. Another important difference in technological culture is the general public's technical literacy in matters of hydraulics and coastal engineering. Measures to secure lower probabilities of flooding, including high taxes and imposing infrastructures, may be more acceptable when citizens better understand the risks and the technical means of coastal engineering defense. Dutch citizens, both as action groups and as unorganised individuals, play active roles in public debates, hearings, or on the discussion pages of national newspapers when it comes to issues of flooding and water management.¹³

So, to conclude this part of the argument, the flooding of New Orleans and the dry feet of the Dutch cannot be explained by hurricanes or good Dutch engineering only. A focus on the difference in technological cultures provides a more comprehensive explanation. This also suggests strategies for coping. If my analysis makes sense, it is unlikely that just importing Dutch engineering solutions into New Orleans will do the trick. Technologies that do not fit the technological culture in which they are to operate typically do not function properly. Technologies ask for investments in money, space, people; technologies need to be maintained, their operation governed; technologies need to be understood – at least to some extent – by the people that use them. Dutch technologies may help New Orleans, but without a proper fit with the US technological culture foreign technologies will be as effective as the proverbial refrigerator in a Sahara country without electricity.

Vulnerability is inevitable, not just negative

The second point I want to make about vulnerability is that it is not necessarily only negative. To be vulnerable in the sense of being susceptible to breaking down, being destructed or dying is an unambiguously negative personal experience. But there is more to it. I will argue that vulnerability often is inevitable, and in some instances even can be positive.¹⁴

I need not say more about the *negative* meaning of vulnerability – previous references to the 1953 *Ramp* in the Netherlands and the 2005 Katrina flood in New Orleans should suffice.

Let's explore the inevitable vulnerability – a form of vulnerability that is not exactly positive *per se*, but an inevitable consequence of something that we have deemed positive. The easiest examples are large technical systems. Many of us enjoy GPS systems for navigation and mobile phones for communication, but these also entail new and inevitable vulnerabilities – due to, for example, lack of battery power, lack of connectivity, or technical failure.

A cultural perspective, however, offers insights that go beyond the technical gadgets. My colleagues Anique Hommels and Eefje Cleophas study the vulnerability of emergency communication.¹⁵ Their analysis of the Enschede fireworks explosion explicates differences between German and Dutch technological cultures of emergency handling (both employing volunteer firemen and firewomen). The German culture of fire fighting is deeply rooted in community life: German fire brigade culture is often described as '*kameradschaftlich*', while Dutch fire fighting culture is considered 'professional.' Many Germans join the fire brigade in their youth, and the number of German firemen is about three times as high as in a comparable Dutch city. Linked to this is the cultural phenomenon of '*noaberschap*'

(or *Nachbarschaftshilfe*), the idea that you help your neighbours whenever they need it. This notion played an important role during the disaster in Enschede. Without being officially called, fire trucks from Germany just pulled in when they heard about the explosion, referring to their duty of neighbour assistance. The fact that they came unannounced was a mixed blessing, according the chief commander of the Enschede fire department: "Uncoordinated action is the worst thing that can happen... because you lose control, people take risks, there is no communication, certainly not when they begin spontaneously and use their own communication technologies. So on the one hand, you have to be very grateful that it happens – on the other hand, it is important to coordinate this in a different way." The vulnerability of this emergency communication system (i.e. the gaps in coordination) goes hand in hand with positive effects (i.e. quick response because of *noaberschap*).

There are even examples where vulnerability seems to be directly positive. In a small-scale irrigation system in Tanzania, the dams are not made of concrete or bricks but of sand and clay, because the clay dams require more maintenance. Maintaining the technical dam system, it is argued, will also help to maintain the social cohesion in the village. Here the relative vulnerability of the clay dams is explicitly and strategically employed as something positive.¹⁶ In this example I am not talking of just a failure of the dam technology – that could

be compensated for by just another technical back-up device – but of a different frame of mind: to see vulnerability as an opportunity to act, learn and innovate.

Similarly the vulnerability of the Dutch living below sea level can be argued to have had the positive effect of stimulating a more cohesive style of politics. In the 12th century the ‘water boards’ were established. They were the first form of democracy in the Netherlands. The duties of these water boards included communal tasks such as drainage, dike maintenance and sluice management, and they could claim taxes. A few times per year they held inspections, and when parts of the hydraulic infrastructure were found out of order, the responsible persons were severely fined. Only during the 18th century did a more central oversight develop gradually, and in 1796 the first national agency, *Rijkswaterstaat*, was established.¹⁷

Dutch political culture still shows several characteristics that can be traced back to this early history of water politics. First, there is a certain trust in technical solutions and in technocracy. Indeed, close links exist between policy makers and scientists (including social scientists) and engineers. A sense of vulnerability, because of the century-long relation with high water, is combined with a style of proactive and consensual policy making and a capacity to react swiftly to crises. In such reactions, Dutch politics will often take a pragmatic approach

to find *ad hoc* and flexible solutions, even when this means that regulations need a ‘flexible interpretation’.¹⁸ The Dutch have a long tradition of planning and actively shaping their environment. This not only applies to the geophysical Netherlands, but also to Dutch society – Dutch political culture displays a general belief in the malleability (or *maakbaarheid*) of society. Finally, the political culture in the Netherlands is distinctly consensual and oriented towards cooperation and compromise. This is not to say that there are no opposed interests or conflicts; but in the end the Dutch need a form of cooperation to find a feasible solution, under the penalty of being flooded. If you deem this ‘Poldermodel’ style of political-economic cooperation positive, as I do, then that is a positive effect of the vulnerability of the Netherlands.

In some obvious sense, weavers working on handlooms are vulnerable to the effects of globalising textile markets and efficient mass production. But the decentralised nature of the handloom technology and trade also implies a flexibility that may allow for a swift reaction to the changing colour preferences of the upper middle class, which is prepared to pay a bit more for sustainable products. The vulnerability of the small and decentralised handloom weaver may turn into strength when the context changes and flexibility is more valuable than cost-efficiency.

I have talked about Tanzanian clay dams, Dutch polders and Indian handloom weavers. Also at the most general level, I want to argue that vulnerability can be considered a necessary condition for the survival of a society: only if a culture is capable of learning, innovating, and flexibly reacting to external threats, will it be sustainable in the long run.

For innovation one has to be creative and take risks.¹⁹ And that implies some degree of vulnerability. A culture needs to be flexible, and thus a bit vulnerable, in order to survive. Vulnerability is inevitable in a technological culture, and to some degree it is even positive.

Implications for understanding and intervening

I have made two points: that vulnerability of both humans and technical and social systems is best studied as vulnerability in technological cultures; and that vulnerability can have positive implications. Let me try to add a third point. Let me try to answer one of the most dreaded questions after a presentation in our department's research seminar: *so what?* Does all this have any implications beyond a better scholarly understanding of the development of technology in society; does it yield consequences for moving beyond the confines of academia?²⁰

First, I hope that the language of vulnerability will help me to address questions of community, democracy, justice. The language of risk, with its tendency towards quantification,

optimisation and management seems less fit to deal with these broader issues.²¹ Vulnerability is, I have argued, part of *la condition humaine* and especially part of the human condition in technological cultures. But the fact that vulnerability is inevitable does not make us less responsible for responding to it, dealing with it, shaping a just and democratic society around it.

To illustrate how an analysis of vulnerability opens up for questions of justice, I will turn to yet another example – the Muslim minority in India. The vulnerability of Muslims in the state of Gujarat is partly caused by their condition of being a minority in a Hindu state, and partly by the high-tech economic development that the present Hindu government is pushing through.²² This government pursues the creation of a new technological culture that is very different from the plural, syncretic culture of the old Gujarat in which Muslims and Hindus lived well as neighbours. The new state vision projects a global Gujarat of special economic zones, science cities, high-tech infrastructures, privatised ports – and Hindu identity. It seeks an erasure of the old history with its trades and crafts, its memories and its identity politics. “Let us forget and move on”, the new middle class prays. But with the erasure of memory, new vulnerability is created. Vulnerability needs a memory because memory prevents erasure, allows living.²³ Justice demands memory and it is precisely this that the vulnerable Muslims in Gujarat are asked to abandon. They are

asked to give up the right to their own story as part of the move into a new Hindu technological culture. This analysis of the vulnerability of Muslims within the new technological order of Gujarat as resulting from a combination of techno-economic development and religious identity politics sheds new light on the relations between technology and justice, between economy and democracy. The consequences are not just for the Muslims, but also for the Hindus who now may have to face counter violence, including terrorist attacks. The Gujarat state policies thus breed specific vulnerabilities that may result in a broader breakdown of society. Democracy and justice are the only way out, not as something given by the powerful to the poor or underprivileged, but as the only radical way to make a technological culture that does not generate such vulnerabilities.

The vulnerability of the Muslims, *adivasi* and *dalits* in Gujarat may seem different from the other kinds of vulnerability I have been talking about during this afternoon.²⁴ It is not. The violence that creates this kind of vulnerability in modern India is inextricably connected to the changing technological culture. Whether it is the economic development and the chain of modern research institutions in the Gandhinagar-Ahmedabad corridor, or the push from the green to the generevolution, or the almost religious belief in an Indian nuclear programme – these only make sense as part of a specific technological

culture. (In exactly the same way the radical advice by the recent Dutch Delta Commission to step up the water management investment and innovation only makes sense in the context of Dutch technological culture.²⁵) And all these interventions create new vulnerabilities. The Gujarat policies have inescapable effects on all groups in society, and certainly on the weak and poor (who will be paying the costs for the new Delta plan is not yet clear). I thus hope to have shown that the perspective of vulnerability does open up for broader questions of justice and democracy.

But still: so what? What use is it to tell these stories? Why not read a proper novel, or – on this location – listen to a real preacher? What use is this cultural science research into the relations between technology and society? What is the answer to the ‘so-what’ question? I will give you two answers: the STS mirror and the STS kiss.

My colleague Jessica Mesman studied the vulnerability of newborn babies in neonatology intensive care units (NICU).²⁶ As an anthropologist (and a nurse) she spent several years observing the NICU doctors, nurses, children and parents. Her aim was to figure out how the interplay of knowledge and skills, of technologies and humans, was successful in coping with such extremely vulnerable lives as these small babies. Her project turns the standard way of looking at patient safety

upside-down. This standard way is to prevent accidents by detecting and eliminating causes of error. To do so, protocols and safety devices are developed. Mesman wondered: why don't things go wrong much more often in these very complex, high-risk settings? How is it possible for protocols to maintain safety, despite the fallible technologies, unrealistic rules, and incompatible procedures and systems that are inherently imperfect by their very nature? To answer this, she looked beyond the deficit model of safety (I mean: safety is the lack of error), and started to include the texture of the safety itself, including its informal and unarticulated dimensions. Patient safety, she showed, is also realised by unplanned but effective actions, hidden competences of the doctors and nurses, and informal social structures in the NICU.

The neonatology people liked her work. Why? Did this cultural scientist tell them anything they did not already know? No and yes. *No*: Mesman only reproduced what the NICU inhabitants told her. But *yes*: she retold what she saw in her STS (science, technology and society studies) language, and that was new. Her book holds up a mirror to the neonatologist. And like all mirrors, the STS mirror does not simply reproduce, it is not innocent: as you may have a better tan, may look slightly taller or slimmer when you look into the mirror of a fashion shop, the STS mirror highlights certain observations and adds interpretation, theory, explanation.

Well, that is at least something: the cultural scientist holds up a mirror to the world she has been studying, and those who look into the mirror may benefit from what they see and thus benefit from the cultural science research. But you may feel that this is a cheap and easy way out: after all, the effects of learning are completely delegated to those who look into the mirror, to those who have been studied. The STS-er seems to come away untouched and with clean hands.

But then the Maastricht University hospital asked this STS researcher to join a committee to improve neonatology safety; and she accepted an invitation to participate in a task force on patient safety with practitioners from hospitals and industry. This is more than holding up a mirror. This is engaging, and making dirty hands. Here we need a new metaphor. What we see here is an enactment of the Sleeping Beauty fairytale and the *STS kiss*. Like in the case of the mirror metaphor, all the knowledge and beauty is in the world (the sleeping princess) studied by the anthropologist (the prince). But after kissing her awake and making her aware of her own knowledge, skills and insights, the prince does not turn away, but engages with the world – even marries the princess. To say that the STS researcher is now making dirty hands, would be an unfortunate mix-up of metaphors with the beautiful and clean princess, but I trust that you are getting the message.

Engaging cultural science research is crucial to understand the wider implications of technology being embedded in society, and current societies being constituted by technology. This also applies to better understanding the issues of security, risk, and vulnerability, including the strategies to manage these. This kind of STS research is about turning vulnerability into a source of strength, into an opportunity for innovation, into justice and democracy. But to realise these, the STS mirror is not enough; and the princess should not be passively beautiful. The prince needs to be prepared for a slap in the face from the princess, before she gives him the time of day. Engagement between scholars and practitioners will never be easy, the goal is not pre-set, and the rules of the game need to be invented on the move. But there is no way back: once the mirror is held up, once the princess is kissed awake, once the prince has ducked her slap – engaged cultural studies of vulnerability will never be the same.²⁷

This afternoon, I have argued that our worlds are inevitably vulnerable, that this vulnerability is best understood from the perspective of the specific technological cultures, and that there are more fruitful ways of dealing with these vulnerabilities than trying to bring all risks as closely as possible down to zero. This is not an argument to accept the risks of traffic accidents, or to not regulate against toxic nanoparticles, or to go bungee jumping. It is an argument to engage in innovative

and interdisciplinary ways of handling vulnerabilities to open up for new perspectives on shaping our highly developed societies. Our worlds are vulnerable in their core. Once we recognise that, we will be better capable of coping with and in some instances even benefiting from these vulnerabilities.

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Notes

* I am grateful to Tonny à Campo for her helpful close reading of previous drafts.

¹ Internal report for Dastkar Andhra by Shyama Shyamasundari; see also "Siricilla rocked by three more suicides by weavers", The Hindu national newspaper, 28-09-2008. Siricilla is a powerloom centre, where weavers who used to be handloom weavers moved to power looms. The move from handloom to powerloom was an effort to 'modernise' and be more productive and cost-efficient on labour. The current crisis in Siricilla originated because the powerloom weavers have not been able to modernise to the next level to be even more cost-efficient, and so they completely lost their markets to newer textiles centres.

² See Prasad (2001).

³ See, for example, the collection edited by Bijker and Law (1992)

⁴ See the comparison by Bijker (2007)

⁵ I deliberately use this oxymoronic phrase 'technological culture' to underscore the need to transcend the popular opposition between culture and technology (Bijker 1995).

⁶ This is a methodological and heuristics argument about how to study the development of technology and society in their mutual interactions, and should not be confused with recent political discussions about 'Dutch culture.' See Koenis (2008) for a critical analysis of this other use of the concept of 'culture.'

⁷ See Perrow's (1999 (1984)) classic.

⁸ See the American history by Wiegel (1996: 555) and the Dutch history by Bijker (1996)

⁹ See also Wetmore (2007).

¹⁰ The common phrase 'hundred year flood' is deceptive if understood to mean that such a flood will only occur once every 100 years. The problem of misunderstanding probabilistic reasoning in this way by the general public certainly exists as much in the Netherlands as in the U.S.

¹¹ See, for example, Thomas Hughes' (1983) classic study of different styles of electrical engineering and electricity distribution networks.

¹² See Mukerji (2007)

¹³ This claim should probably be toned down in the light of social trends that also exist in the Netherlands: individualisation, consumerism, and lowering memberships of social organisations such as political parties and labour unions. The low turnout in all elections, and especially in my favourite ones – for Europe and the Dutch water boards – is perhaps also indicative.

¹⁴ In addition to Charles Perrow's work on normal accidents, Ulrich Beck's (1986; Beck 1992) seminal study of the Risikogesellschaft is a crucial foundation for this analysis of vulnerability in technological cultures be. Below I will return to the question why I need the concept of 'vulnerability' rather than 'risk.'

¹⁵ See Hommels (2008)

¹⁶ Personal communication: Prof. José van Eijndhoven, PhDs, remembered this example from a presentation by Dr D. A. Mashauri, University of Dar es Salaam.

¹⁷ For more details on early Dutch politics and water management, see Kaijser (2002) and TeBrake (2002).

¹⁸ Non-water examples are the Dutch abortion, prostitution and drugs policies. The swift handling of the recent financial crisis is another example.

¹⁹ See also Schumpeter's (1942 (1975)) 'creative destruction'.

²⁰ Conversations with Annappurna Mamidipudi about the questions in this section were very helpful.

²¹ I am certainly not arguing that all risk-based discourse has that narrow gauge. Much of the work by the Health Council of the Netherlands on this topic can be summarised as arguing for a broadening of the concept of risk (Gezondheidsraad 1995, 1996), and also Beck's Risikogesellschaft offers such opportunities. Recent advisory reports by the Health Council (Gezondheidsraad 2006, 2008) and the Scientific Council for Government Policy (WRR 2008) have argued for the use of the precautionary principle, which also broadens the risk discussion to address issues of justice and democracy.

²² I am indebted to discussions with Shiv Visvanathan, Tridip Suihrud, Aditi Nath Sarkar and Binita Desai. See also Visvanathan (2008).

²³ Chandrika Parmar's (Parmar 2008) work on violence and memory related to the partition between Pakistan and India is very insightful.

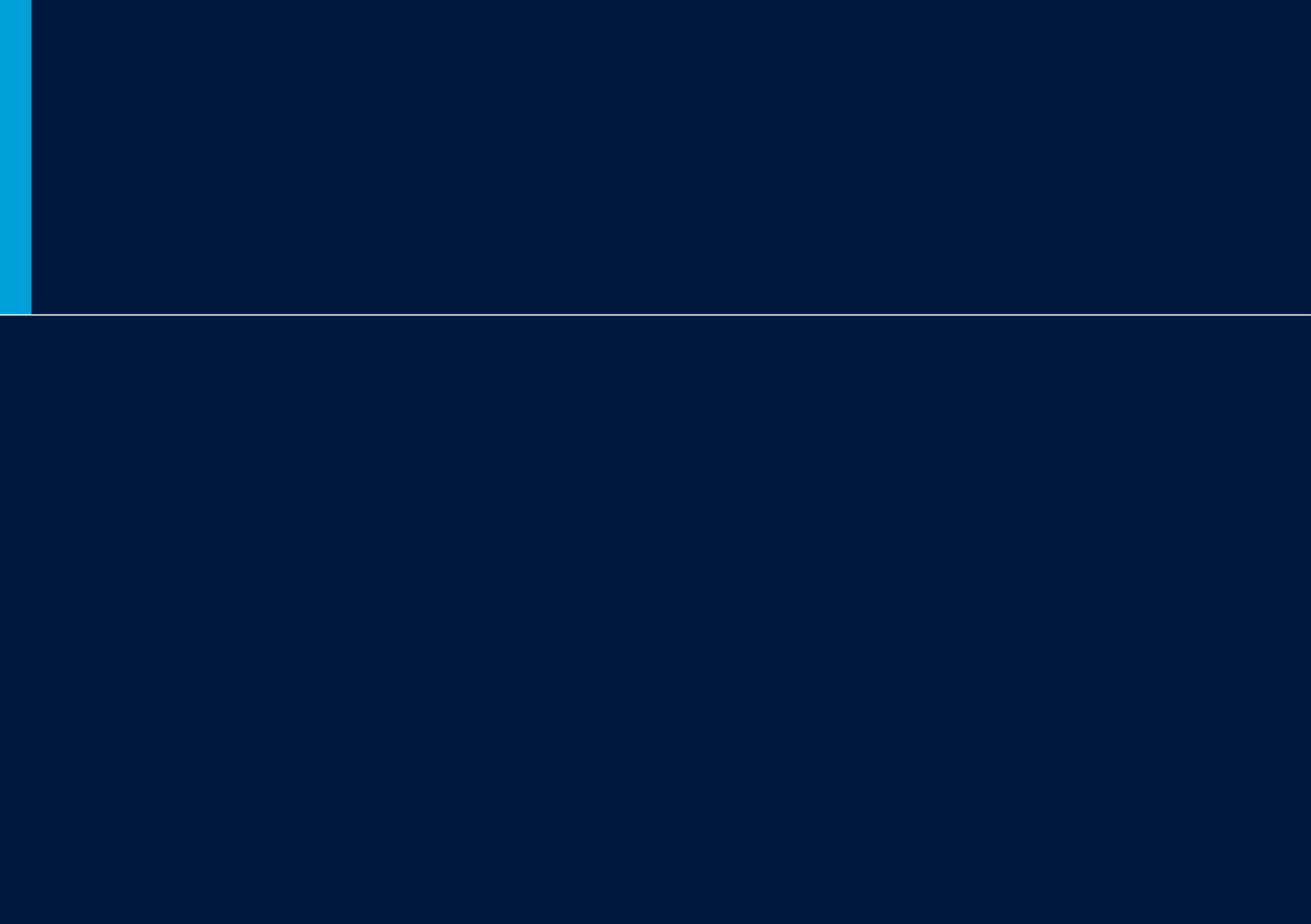
²⁴ 'Adivasi' is the self-preferred name of tribals, a heterogeneous set of ethnic and tribal groups believed to be the aboriginal population of India. They comprise a substantial indigenous minority of the population of India. They are officially recognised by the Indian government as 'Scheduled Tribes.'

'Dalit' is the self-designation of lowest caste people, also known as untouchables. The official governmental term is 'scheduled caste.' The government category 'Scheduled Castes and Tribes' is eligible to certain affirmative action posts.

²⁵ See the recent report by the Deltacommissie 2008 (2008)

²⁶ See Mesman (2008)

²⁷ Another example of such collaboration between (STS) researchers and practitioners is the EU-funded project 'Science, Ethics and Technological Responsibility in Developing and Emerging Countries.' This project, with participants from India, Kenya and Europe, aims to formulate a science and technology policy from the perspective of countries in the global south instead of their merely following the agenda's of the north and the west.



Speech on the occasion of the 33rd Dies Natalis

8 January 2009

Laudatory address for Professor John Campbell

Prof.dr. P. Eichholtz



Dear Professor Campbell, dear John,

It is a great pleasure and privilege for me to deliver the laudatory address on the occasion of your honorary doctorate here in Maastricht. Maastricht University's academic community is truly pleased to give you this doctorate, which you have earned through your consistent fundamental contributions to the field of financial economics.

Within that field, you have ranged widely and deeply. From asset pricing to household finance, from macroeconomics to portfolio management, and from consumption to pensions, your contributions have changed our thinking fundamentally. You have created new directions of academic inquiry, and have created many of the tools needed to undertake that inquiry.

Not only have you done fundamental theoretical and empirical research; your research has made you truly prophetic at turning points in recent financial history. The best example of that was in 1996, when you and Robert Shiller testified before the US Federal Reserve about the state of the stock market on the basis of your long-run research of stock prices and the fundamentals driving them. The central tenet of your testimony was that the stock market was overvalued, and was set to fall. It was then that Chairman Greenspan's famous words 'irrational exuberance' were coined, but not by him. At the time, this prediction was sometimes ridiculed, especially as stock prices rose sharply for another four years. However, your remarks of 12 years ago have turned out to be eerily prescient. The ratio of stock prices to earnings is now back to where your model predicted it in 1996. We should all have listened to you much better and much earlier.

This honorary doctorate is one in a row of honours you have received throughout your career. For example, you have been named Fellow of the American Academy of Arts and Sciences, Honorary Fellow at your old college Corpus Christi at Oxford, and President of the American Finance Association.

You have often used these positions to create a platform for your ideas. For example, on the occasion of your AFA presidency in 2006, you gave a keynote address entitled 'household finance', which deserves special attention in light of the current financial crisis. Not only have you put the subject of household finance firmly on the academic map, you have also argued for new financial products and training designed for the financial illiterate, i.e. for most of the population of this world. Better regulation of mortgage markets was also on your 2006 wish list. Again, if only policy makers had listened more attentively ...

As scientists, our lasting mark on society is of course not only made through our research, but also very much through our education of new generations of professionals and academics. There also, you have made a lasting mark, both through your own teaching, and through your books. Your qualities as a teacher have recently been awarded with a Harvard College

Professorship, especially for your success in helping undergraduate students appreciate the intellectual challenges posed by our financial markets, by their risks and returns, by their behaviour in the short and the long run, and by the public policy challenges of regulating them.

In your PhD classes, you have trained a significant group of very talented young academics, who in their turn have spread around the world, becoming educators in their own right.

As for your books, *The Econometrics of Financial Markets*, which you wrote with Andrew Lo and Craig MacKinley, is a true classic and indispensable in any serious PhD programme in financial economics. A more recent example is *strategic asset allocation: Portfolio Choice for Long-Term Investors*, with Luis Viceira, which is rapidly getting a similar status.

In conclusion, you are truly a giant in the field of financial economics, and Maastricht's academic community stands in awe of your consistent fundamental contributions to it, both as a researcher and as an educator. We are therefore very pleased to give you this doctorate.

By the authority vested in me by law, and in conformity with the decision of the Board of Deans, I hereby confer upon you, John Y. Campbell, the degree of *Doctor honoris causa* and all the rights flowing from this by law and tradition. As evidence of this, I present to you the degree certificate signed by myself, the Rector and Dean of the Faculty of Economics and Business Administration, with the great seal of the university affixed to it, and I invest you with the cappa that signifies the honour bestowed upon you.

